

**PHC2024/04:** Understanding the risk to Scotland's plant health arising from wireworm (click beetles) and the monitoring and Integrated Pest Management requirements.

**Background and knowledge gap:** Wireworm infestations in multiple high value/hectarage Scottish crops are being reported in increasing numbers, however there is little information on the species involved, or their numbers, locations or damage levels in Scotland. This lack of local data on species presence across Scotland makes it difficult to develop control strategies or issue advice for Scottish growers, with a risk of yield loss and/or potentially inappropriate pesticide usage as a result.

Wireworm is an established pest within the UK, with almost all the advice and research relating to its management originating in England. There are approximately 70 known species in the UK with at least 5 known crop pests. Most of the damage done to crops is caused by three species: *Agriotes lineatus*, *A. obscurus*, and *A. sputator*. Notionally, data on reported (both unconfirmed and accepted) findings of these species in the UK are available (via the National Biodiversity Network) however they are sparse, historic and known to be outdated. For example, despite confirmed trappings in 2024 (SAC Consulting) there are only 3 "unconfirmed" findings of *Agriotes lineatus* in Scotland in the database – Lanark 2003, Dumfries 1991 and Gretna in 1937.

Wireworms cause extensive feeding damage on many crops such as vegetables (potatoes, carrots, onion, leek, parsnips, radish, & sugar beet), cereals (maize, wheat & barley etc.) and fruit (strawberry). Using potatoes as an example - tolerances for wireworm damage by potato processors and supermarkets usually vary between 0 - 5% of tubers with holes less than two peels deep. Consequently, advisory statements on wireworm management are often very basic and advise not planting potatoes in fields where wireworm is present, which is not very helpful. There is a lack of basic information about where the pest is likely to occur, how to sample for it and which species are present. The economic cost for growers can be substantial if stock is rejected on these grounds.

Monitoring and reporting of wireworm in Scotland is effectively non-existent, which makes sustainable management of the pest very difficult for farmers. High risk scenarios also need to be elucidated. Historically, it was thought that wireworm is most likely to be found in fields with long term grass, however research in England and further afield has now shown that field risk factors for wireworm infestations are much broader than this and may include risks associated with cover crops, which gives this proposal added relevance. In the south of the UK, monitoring for wireworm is carried out using either bait ball traps (autumn) or pheromone traps (spring) as options. Timings are often weather dependent. To aid Scottish growers going forward the most effective trapping methods need to be determined and, if necessary, further developed. Research into the distribution of wireworm and the most appropriate trapping methods that growers can use will lead to advice on best practice. Knowledge exchange with farmers is urgently required to manage this pest before it becomes a large-scale problem for the industry. The project should focus on potatoes as the most economically important of the crops at risk in Scotland, but findings will be relevant to other crops.

**Plant Health Centre**

C/o James Hutton Institute, Invergowrie, Dundee DD2 5DA

Phone: +44 (0)1382 568 905

Email: [info@planthealthcentre.scot](mailto:info@planthealthcentre.scot); Web: [www.planthealthcentre.scot](http://www.planthealthcentre.scot)

**Impact:** The outputs of this project will help to obtain an up-to-date data set on which wireworm species are present in Scotland, along with information on locations and risk factors. This will establish the foundation for on-going species monitoring in future. The project will lead to updated advice and guidelines on integrated pest management, with clear links to monitoring information. Knowledge exchange arising from the project will target Scottish growers and agronomists about the updated risk factors for wireworm, how and when to effectively set up traps themselves and myth bust outdated information. This will give the project findings longevity as growers and agronomists will be guided to the best monitoring methods for them to use themselves, rather than being dependent on centralised monitoring information.

**Objectives and research required for this call:**

The objectives of this project are to:

- Use field history from a representative range of sites and locations to elucidate key risk factors (for example factors such as location and cropping history) in the occurrence of wireworm as a problem in potatoes
- Develop a monitoring programme over a representative range of sites and locations to determine current species status in Scotland and their locations
- Evaluate available trapping methods at suitable points in the season as predictors of damage at a location and use this to develop a grower friendly protocol for self-assessment of risk
- Produce updated agronomist and grower focused advice for practical IPM measures to reduce risk and manage wireworm

The research proposed should include a review of available literature, including grey literature sources, primarily in the rest of UK but including any key international finding that are relevant to Scotland. The review should include information on key species causing damage, key risk factors, trapping methods and integrated control strategies. The project plan should include the design and implementation of a survey of potatoes post-harvest in 2024 to correlate field history with degree of damage to elucidate key risk factors in Scotland. The research should also design and implement a survey of field sites to monitor the species trapped and evaluate the two available trapping methodologies in spring and autumn so that the most appropriate and accurate method for Scottish fields can be developed into a grower focused protocol. To that end the project team should engage with growers before the end of 2024 so that suitable sites are identified in good time to deploy traps in April 2025. The survey data generated should also be used to summarise the current status of wireworm/click beetle species and locations in Scotland. Having ascertained the current status of wireworm species in Scotland, the project will produce updated, practical advice on key risk factors and integrated disease control methods, derived from survey findings and the literature review. This should include the grower/agronomist protocol for self-monitoring of sites judged to be at risk. The research and the outputs should focus on the risk to potato crops, but the final report should include the context and impact of findings on other Scottish crops at risk.

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### **Deliverables required from project:**

- Final project report including publicly available data of wireworm species and presence across different key growing areas of Scotland.
- Advisory materials for distribution to growers/agronomists (leaflet/factsheets on risk factors, IPM strategies, and trapping instructions).
- Presentation of findings and recommendations at farmer focused events.
- Final Report with executive summary, to contain along with key sources, analysis, findings and recommendations for implementation or further work (30 pages maximum of text and figures, excluding appendices and references). Cover image(s) with associated photo credits should also be supplied.
- Brief policy summary (2 pages maximum) explaining how the work has contributed to filling evidence gaps, detailing the need for appropriate monitoring and links with IPM practices and pesticide usage, and the context in which the findings can be used by policy makers and practitioners.
- Presentation at Scotland's Plant Health Conference and any other relevant stakeholder meeting(s) to disseminate findings and contribution to other KE output such as the PHC virtual poster room or blogs.
- 200 words lay summary for project overview at outset, and of findings at completion (for website and newsletter).
- Slide deck of the key project findings.

### **Meetings:**

- Project meetings throughout project lifecycle to include PHC manager, PHC Sector Lead and Scottish Government policy contact and commissioning stakeholder.
- Meeting/s with relevant PHC Impact Officer and Communications Officer to plan dissemination of project findings and impact strategy.
- Attendance at briefing discussion with PHC Steering group to discuss findings and next steps.

### **Indicative key dates:**

- Deadline for submission of applications: 12pm on 30<sup>th</sup> August 2024
- Project start: 28 October 2024
- Overview of plans and project start-up meeting with PHC Directorate: 4 November 2024
- Post harvest survey of potatoes for damage completed: 16 January 2025
- Spring field survey completed: 31<sup>st</sup> May 2025
- Autumn field survey completed: 30<sup>th</sup> September 2025
- Final report and policy summary: 30 November 2025
- Project outputs signed off by PHC Sector Lead: 23 December 2025

Detailed milestones to be confirmed by bidder.

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**Date all work needs to be completed by:** 30 November 2025

**Maximum funding available exclusive of VAT<sup>1</sup> (where applicable) and including any knowledge exchange activities: £30, 000**

### Submitting an application form

Applicants should use the PHC Application form when applying for projects and must ensure they are able to accept the [PHC Funding Terms and Conditions](#) before submitting an application.

Completed applications should be submitted to [info@planthealthcentre.scot](mailto:info@planthealthcentre.scot) for evaluation by 12pm on Friday 30<sup>th</sup> August. Successful applicants will be notified by Friday 26<sup>th</sup> September, and we may request further clarification on any aspect of the application prior to contract award. You should highlight any potential conflicts of interest in your proposal.

Please contact the Centre Manager if you have any queries ([info@planthealthcentre.scot](mailto:info@planthealthcentre.scot)). Answers to any non-confidential questions will be published on our website.

### Review of application

Applications will be reviewed by a panel selected from the PHC Directorate, Scottish Government, PHC partners and/or commissioning stakeholders, as appropriate.

Expectations for section 1 of the application form:

| Expectation           | Descriptor  |
|-----------------------|---|
| Duration              | The proposed duration will align closely to the details provided in the anticipated timescales section of the specification.  |
| Staff time and effort | The proposed allocation of staff time and effort is appropriate and includes all deliverables. The proposal must also provide a commitment that named staff members will be available to work on the contract if the bid is successful. |
| Project costs         | The estimated breakdown of project costs is realistic and inclusive of all deliverables.  |

Expectations for section 2 of the application form:

| Expectation | Descriptor   |
|-------------|--|
| Background  | The proposal should include an introduction which demonstrates a clear understanding of the project requirements. This should include the need for this research; the project aim; and how the proposal will address this aim. |

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|   |  |
|---|--|
| Proposed methodology and outcomes                   | The proposal should demonstrate a high quality and workable methodology, including: how the evidence will be identified, reviewed and assessed, consulting relevant stakeholders and/or experts where appropriate, to address the key questions and produce the deliverables in the timescales required.                                 |
| Milestones  | The project milestones are logical, practical and include all deliverables.  |
| Project Management                                  | The staff, resources and expertise are appropriate for conducting the proposed project. The proposal should name the project lead.   |
| General and specific topic expertise and experience | The proposal should provide details of individual staff members who will work on this project and demonstrate how they will meet the project requirements, specifically: <ul style="list-style-type: none"> <li>- general research experience and expertise</li> <li>- specific experience and expertise relevant to the call</li> </ul> |
| Risk  | The proposal should provide a risk assessment matrix detailing any risks identified in relation to the delivery of this contract, and proposed mitigation measures to minimise their probability and impact, focused particularly on risks to completion on time.  |

<sup>1</sup> Please note that costs should be submitted net of VAT recovered by the applicant. Applicants should seek advice on appropriate VAT treatment of proposed funding.

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